일본병원건축 디자인의 최근 경향

Health Facilitv Design Trend in Japan

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최근 일본에서는 병원과 노인보호시설의 디자인 경향이 나타나고 있다 .다음 세기에는 건강시설 디자인과 건강보호 환경이 중요하 ㅏ게 강조될 것이다 . 이 발표에서는 역사적 ,문화적 ,지리학적 그리고 사회 경제적인 견해에 대한 국제 비교연구가 간략하게 소개될 것 것이다. 또 한 건강문제에 있어서, 과거의 건강보호 서비스의 제공과 지역간의 건강보호 네트워크 시스템 뿐만 아니라 인구학 및 유행 ·행병학에 관한 문제, 그리고 최근의 급속한 의료 발전에 대한 내용들이 발표될 것이다

당대의 일본 병원들의 건축적 특성들은 다음 8가지의 닉네임으로 나타내어 이에 대한설명이 이루어질 것이다 .즉 , (1백화점식 병원(Departmentstore hospitals) (2)재벽시장과 같은 병원 (morning market hospitals) (3)chower hospitals (4)하이테크소비적인 병원 ㅣ원(high-techconsuming hospitals) (5)scrapand builthospitals (6) 출근시간의 열차와 같은 병(원rush-hour train hospitals) (7) 7) crone hospitals (8)sulm hospitals이 다음으로 위와 같은 일본 건강관련시설의 디자인을 초래한 3가지 주요 요인들 즉 ,(1)독립적인 운영과 확대 (2)고층화와 밀집화 (3)독립형과 평균수준에 대한 내용이 소개될 것이다.

앞으로 노령화되고 있는 일본사회에서 건강 관련문제 및 건강관련 시설 디자인을 개선하기 위해서는 ,보다 광범위한 지역에 대한 · 건강관련 시설의 계획 , 고도의 의료기술 ,시설 및 재가보호의 통합 ,급성 맏성 치료 병원의 정의 가족 환자를 위한 더 나은 치료 환 환경, 그리고 건강관련 시설에 종사하는 직원들에 대한 작업환경 개선 등이 요구된다 .위에서 제안된 측면들은 도쿄대학과 다른 대학들 들, 그리고 인간과 환경에 관한 연구기관 (MERA를 포함한 연구기관들에서 수행된 다양한 연구들을 토대로 하고 있다 또한 일본의 건강 .강보호 관련시설 건축기관 (JIHA)에서 수상받은 최근 가장 유명한 건강관련시설 디자인 프로젝트를 통해 여러 측면에 대한 설명들이 이 이루어질 것이다 .

마지막으로,2050년의 건강보호 관련환경을 연구하는 주요활동으로서 건강보호 시설 건축에 관한 범세계적인 대학 프로그램 (GUPHA)이 소개될 것이다.

abstract

The current design trends of hospitals and elderly care facilities in Japan is shown. The emphasis is focused on healthcare facility design and healthcare environment in the next century. An international comparative study in terms of historical, cultural, geographical and social-economical overview are briefly reviewed during the presentation. In addition, health issues on demography and epidemiology in addition to healthcare services provision and regional healthcare network system in the past, including early and recent centuries as well as quick advancement in recent years are presented.

In order to emphasize the architectural characteristics of Japanese contemporary hospitals can be demonstrated with eight nicknames, i.e. (1) Department Store Hospitals, (2) Morning Market Hospitals, (3) Chowder Hospitals, (4) High-tech Consuming Hospitals, (5) Scrap and Built Hospitals, (6) Rush-hour Train Hospitals, (7) Crone Hospitals, and (8) Slum Hospitals. Followed by them, three orientating key factors related to health facility design, i.e. (1) independent and expansion, (2) high-rise and intensiveness, and (3) stand-81one and average level are presented.

Future health issues and needs for health facility

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design in the aging society of Japan, e.g. comprehensive health care regional planning, high-tech medical treatment, integration of institutional/home care, definition of acute/chronic care hospitals, better healing environment for patients/families, and upgrading working environment of healthcare staff are proposed. These aspects above are based on various studies carried out in the University of Tokyo and other Universities/Research Organization, including Men-Environment Research Association(MERA), one of the International Endorsing Organization of this Congress, and also explained through showing recent prominent projects of healthcare facility design, mainly from those awarded by Japan Institute of Health care Architecture (JIHA).

Finally, Global University Programs in Healthcare Architecture (GUPHA) is introduced as a key activity studying healthcare environment the year 2050.

A. Introduction

The objective of this presentation is to introduce the evolutions of heath facility design in Japan based on reviewing in the past, present and prospecting to the future, especially focusing on the year 2050 of next century.

B. Issues on Health and Facility Designs in the Past

In the early stage of the history of Japan, Chinese culture gave strong impact to Japanese culture including Buddhism. Not only for religion but also medical care in early centuries was based on Chinese medicine, e.g. herbal medicine, acupuncture, massage. These technologies were mainly transported through Korea to Japan. Buddhism temples provided treatment and accommodation for poor people.

While, traditional culture had been seen in local Shrine buildings, several authentic cultural movements e.g. tea ceremony, Noh dancing, flower arrangement were established in 16th century. Christianity was introduced by Spanish missionary in 16th century. However the first Western style hospital was built in 16th century by Portuguese missionary, Western style healthcare environment deceased by 17th century, because Christianity was banned since Japan closed the door to everse as countries by Tokugawa General (Shogun) in Edo period. Edo period was regarded as peaceful and incubating time for Japanese cultural development, until Admiral Perry from the US knocked and asked the nation's door open to the outside world in 19th century.

In the mid 17th century, Dutch medicine was introduced in Nagasaki concession, almost the only area permitting communication to outside world during Edo period. Dutch influence had continued until Meiji government in 19th century decided to follow German medicine for the purpose of medical education.

The early hospital building style orientated to medical teaching hospitals in Japan is representing typical pavilion-type consisted of medical/surgical wings. As tuberculosis and other infectious diseases overwhelmingly prevailed over the country, many sanatoria were built during the early half of 20th century.

Hospital administration concept was introduced by the USA just after World W8r 11, and new medical law is legislated. National Institute of Hospital Administration, now called NIHSM, was established under the Ministry of Health and Welfare in order to disseminate information of modern hospital care and architecture.

Architectural model plan of 180 bed general hospital was worked out by Prof. Yasumi Yoshitake of the University of Tokyo in 1950's, based on the hospital administrative policies which crystallized in centralizing diagnosis/therapeutic and servicing/logistic function in addition to establishing inpatient nursing units. Since that time, studies on planning hospital buildings have been carried out in the University of Tokyo and other universities and related organizations such as JIHA (Japan Institute of Healthcare Architecture). The establishment of National Health Insurance System in 1961 encouraged the nation to provide many hospital beds to cope with increasing demand of hospital care. Various types of ownerships of hospitals in public and private sectors were established without heavy restrictions. Yet, tight budget of capital investment, many hospitals were suffered from insufficient floor area

to accommodate loads of inpatients/out-pati ents and medical equipment. In the course of economic development, the situation of tight floor area has been gradually upgraded, but still below the level of the standard among developed countries. At present, variety of hospital types, in terms of ownership, size and function are seen in Japan without efficient networking in regions and nationwide.

C. Issues on Health and Facility Designs at the Present

Total population in Japan is 125.7 million, approximately 3 times of Korea, density is about335 persons per sq. km, 4th in the world, following to Bagradesh, Korea(440 persons per sq, km) and Netherlands. As for the population structure, aging common in Japan and Korea. It is estimated that the percentage of population above 65 years was 11.7% in 1990 and will become 24.4% in 2025, while in Korea, 4.8% in 1990 and 14.8% in 2025. Natural population growth is low in Japan due to the fact that birth rate (9.6 per 1000) is slightly higher than death rate (7.4 per 1000, in 1995). Infant mortality ratio and average number of birth per woman is also becoming low and low in Japan. Life expectancy at birth is 77.2years in male and 83.8 years in female, the world longest. Major cause of death in Japan is cancer which shows about 30% of all death, heart diseases and celebrovascular diseases, while heart deseases have been increasing recent years. These three major death represent about 60% of ail death in Japan. In Korea, the order is natural death, cancer and celebrovascular diseases.

Presently, Gross National Product (GDP) per head of Japan is $33,000 in 1997. Gross National Income (GNI) per head of Japan is $31,000 in 1996. Japan spends 11% of GNP for social security.

Hospitals in Japan are defined as institutions equipped with more than 19 beds. Ownership of Japanese hospitals is various and each organization has different management policy. The private sectors are main force of traction to increase the number of hospital beds. Most of them were established after the war, during the rapid economic growth. Total number of hospitals in Japan is about 9,500. total number of hospital bed is 1.7 million in Japan (63,800 in Korea), which means that the number of population per one hospital bed is 76 in Japan (600 in Korea). This does not simply mean Japanese hospital bed is easily accessible by patients since the length of inpatients' stay in general hospitals in Japan is more than 30 days, far longer than other developed countries.

Presently, there is enough hospital beds available throughout the country, however, the ever increa - sing demand for care of the elderly is the critical problem. Increasing number of nursing facilities and reducing hospital beds, especially psychiatric beds, is current issue of discussion.

D. Eight Characteristics

The problems and characters of Japanese hospitals are illustrated with the following eight nicknames :

(1) DEPARTMENT STORE HOSPITALS

Majority of hospitals provide the health care services to a wide range of patients types to cater for their needs. From architectural point of view, it is necessary to be prepared with all types of facilities in various specialties. They look like to department stores, not specialty shops.

(2) MORNING MARKET HOSPITALS

Even with introducing appointment system of clinics, hundreds and thousands of outpatients come to hospital hours before receiving consultation. However, better services is not guaranteed when they come earlier. Architects who design Japanese hospitals should be careful of size of waiting area. It is rare to find hospitals with so many patients from early morning in developed countries except in Japan.

(3) CHOWDER HOSPITALS

All types of patients are mixed in one nursing unit, like chowder soup in a pot. A general ward contains mixed 50 patients in one unit. These patients can be acute, geriatric or long-term.

(4) HIGH-TECH CONSUMING HOSPITALS

As being high-tech lovers, both patients and

staff, medical equipment such as CT and MRT, automatic analyzer, in addition to automatic material handling transportation and various computer system are one of the top level in the world. Buildings with artificial environment such as air conditioning, mechanical ventilation and lighting containing high-tech machines are certainly money consuming.

(5) SCRAP AND BUILT HOSPITALS

Ise Shrine (Shinto) is renewed once every 20 years. The Newer, the better is national obsession. After 1O years of construction, hospitals can be seen old in Japan. Buildings become old fashioned quicker, so hospitals have short life span, mainly because of poor maintenance.

(6) RUSH-HOUR TRAIN HOSPITALS

Floor area per bed is approx. 60 sq. m in Japan. In US, Europe and some developing countries, it is above 400 sq. m. Average distance to adjacent bed in multi-bed rooms in Japanese hospitals is 60 cm, far behind the adequate number 120-150 cm. This situation looks like to trains containing full of passengers in limited floor space.

(7) CRONE HOSPITALS

Basically buildings including hospitals in every location should represent local culture. However, hospitals are easily recognized from appearance from north to south throughout the country,. Whether public or private, buildings look similar.

(8) SLUM HOSPITALS

Dirty, crowded, long waiting time and unfriendly atmosphere, hospital architecture has poor reputation in spite of every effort of attaining efficient and effective design. Together with management, architecture itself needs to have charm

E. Three Major Orientating Factors

The country enjoys high outcome of health services with relatively low expenditure. However, as characterized above hospitals are with still negative view. The characteristics of hospitals in Japan mentioned above are resulted from the fellowing three major orientating factors;

(1) Independent Operation and Expansion, (2) High-rise and Intensiveness, and (3)Stand-alone and Average Level.

(2) INDEPENDENT OPERATION AND EXPANSION

Hospital is one form of health care facilities. Obviously, it is impossible to solve all the health problems alone by hospitals. However, even after leaning health sonics system in several developed countries based on co-existence with various health service provision, Japan has chosen to mainly establish general hospitals to cater for medical needs. Each hospital is principally independent, without affiliation, thus needs to equip all kinds of diagnostic and clinical facilities. Redundancy of specialties in same region often happens. Although off-site services are available recently, networking is necessary not only for diagnosis and treatment but for meals, sterilization and pharmaceutical operation.

The nation enjoys free access even to tertiary care hospitals, receiving care without worrying financial costs anywhere in the country due to National Health Insurance scheme. On one hand,"3 minute consultation after 3 hour waiting time" is common because of insufficient appointment system. On the other hand, patients' accessibility to any type of sophisticated hospital is higher than any other country. Since patients suffering from various diseases and illness are seen at a general hospital providing various speciality medical services, there is a possibility for a patient to obtain quite integrated diagnosis and treatment.

One nursing unit (or administration unit) is mostly equipped with 50 beds. This figure is lead by the number of nurses necessary for economical efficiency, based on workload regulation called Nippachi (meaning 2-8, minimum 2 nurses per nursing unit for night shift, and each nurse should not be on night shift for more than 8 days per month). Income generating system is not influenced by the length of stay from hospital point of view so that acute and long-term patients are mixed in the same unit. It results in hospital design needs to cater for both highly dependent and less dependent patients. One nursing unit can accommodate maximum of 20 highly dependent patients, thus the rest

of 30 patients need to be low dependent. Under such circumstances, ward design cannot fulfill the needs of everyone.

(2) HIGH-RISE AND INTENSIVENESS

The existing healthcare payment system allowed patients to have easy access to health services, but influenced methods of treatment. Regardless medical personnel's opinion, clinical and diagnostic equipments are introduced to hospitals by administrators to assist income generating. High-tech medical equipments help attracting patients to hospitals, yet not always been used efficiently for clinical effectiveness. After World War 11, "Centralization", the hospital administration methods was brought from USA. Based on this centralization idea, hospital functions such as radiology, laboratory, operation, pharmacy, sterilization, kitchen and medical records formerly within each department were centralized to become "central radiology department", "central laboratory department", "central operation theater" amd so on. This movement enabled hospitals to integrate expensive medical equipment and specialists. At the same time, staff, patients and materials are required to be moved more frequently in a hospital. This lead to the progress of automated handling system. Large size OPD supported by central

patient record system encouraged self-reference, automated material handling and other computer aided system to grow.

Hospitals are built on small and expensive sites. Thus, buildings become high-rise and compact, fully supported by air conditioning and lighting. Running and maintenance cost become expensive. Centralization of departments encouraged bringing artificial environment. On the contrary, this artificial environment is weak against disasters and hazards such a search quake and infection.

Hospital building is operated 24 hours a day, and without sufficient maintenance budget, it wears out fast. As preventive medicine is necessary for human body, progressive maintenance is essential for hospital buildings. Hospital design should take consideration to reducing operation costs. Life cycle costs including demolishing building should be also in the view. Tightness of floor space is due to the self-supporting system of which initial construction cost must be redeemed by medical fee after the operation of hospitals. With limitation to maximum floor area, large OPD and diagnostic department with full of medical equipment shift the loss of size to other departments. For instance, most inpatient wards have average floor area of approx.20 sq. m. per bed which is half the size of Europe and USA. In such circumstance, answering the needs of patient groups of ambiguous attribute in medical and nursing ways leave things half done. Single bedded rooms necessary for clinical reason is not enough. Recently, hospitals have started providing the environment of acute and long-term patients separately. Patients are able to chose medical environment which suits the level of care they need. In some newly built hospitals, average floor area is 80-100 sq.m. The revision of medical insurance payment scale enables hospitals to reflect floor space to medical remuneration. Increase in floor space becomes incentive for raising income.

Ironically, lack of space and staff has restrained from ever rising running cost, and realized retrenchment and efficiency. Countries troubled by rocket shooting rise of medical costs, now referring to Japan's' compactness' and 'less staff' Adequate and appropriate figures in between should be found soon.

(3) STAND-ALONE AND AVERAGE LEVEL

Various operation and establishing organization exists in Japan. However, in terms of hospital buildings, the difference among public and private hospital is small. Generally speaking, public hospitals have higher quality of facilities than private. It is the opposite in developing countries.

Climate, culture and custom in the region should be take into consideration when establishing hospitals. In Japan, provision of hospital was individual, stand-alone oriented general hospital type, not the network of specialty hospitals. Uniform building function and design was duplicated here and there. Locality may have co-existed with modern medicine, and hospital design should reflect the characteristics of each region. However, from Hokkaido to Okinawa, they are similar.

Hospital design and engineering information was

spread out through out the country through basic studies by universities and other related institutions, by JIHA (Japan Institute of Healthcare Architecture) and HEAJ (Healthcare Engineering Association of Japan). As a result, hospitals of above certain quality have been built from north to south. However, exceeding the average level was difficult. The reason is the attitude taken by public hospital authorities, following past examples. That idea helps to understanding general information on hospital design but avoiding individual uniqueness.

Success in ambulance system involving local authority (fire brigades) was an exception, now regional health care planning is in attention to support aging population and sufficient use of limited resources.

F. Health Service and Health Facility Design Issues from Now

(1) FROM MEDICAL INSURANCE TO CARE INSURANCE

The exiting situation of caring many elderly patients in general hospitals reveals the need of providing appropriate various care facilities for them e.g. hospitals, halfway houses, skilled nursing homes, group homes and ordinary homes. Based on the background of aging society, integration of institutional and home care is requisite.

New care insurance scheme introduced from April 2000 will change he scope of caring for elderly considerably. To shorten the length of hospital stay will be recognized as critical factors for efficient hospital management.

(2) NETWORK OF MEDICAL SERVICES

It is also necessary to provide various types of health facilities to cope with each different need of individual patient in acute care. Regional healthcare planning law which was introduced in 1990s requires each local government to work out comprehensive plan for health services provision including the certificate of need for hospital beds. Relationship of hospitals and clinics is requisite to attain comprehensive health care regional planning.

Clear distinction of acute and chronic hospital will rearrange large nursing units into appropriate size depend on particular nursing requirement. High-tech medical technology will be more rapidly and more sophisticatedly developed in 21st century and applied to acute/lifesaving hospital services, such as emergency trauma and heart attach treatment.

On the other hand, more holistic and low-tech medical treatment should be also developed, e.g. in the case of terminal care in hospices or in their own home. Alternation of Japanese medical laws in these days should follow this direction. Physical provision of better caring environment for patients, families as well as of upgraded working environment for health care staff is expected.

(3) HEALTHS ENVIRONMENT

The negative reputation towards hospital building is derived from its character as "total institution" In 1961, a sociologist Irvine. Goffman named, through his experience of working in a psychiatry hospital, a group of facilities which restricts people for 24 hours a day, "total institution". There, staff zone and patient zone are clearly separated, and the former efficiently manages the latter. Working, playing and sleeping, the three major elements of daily life, were taking place in limited activity zone at the same time. Goffman pointed out that this extraordinary environment is harmful to treatment.

From this point of view, both prison and hospital are total institutions. It is known that dementia deteriorates and independency retrogrades when elderly persons moves from their own homes to nursing homes. This phenomenon is now called Institutionalism, and Goffman pointed out and warned promptly.

In comparison to western type hospital based on physicians' visits to patients' zone, hospitals in Japan expanded to accommodate patients to physicians' zone. Brilliant groups of physicians and highly educated co-medical staff supported the trend of the clinical oriented environment settings. Wards, supply and support zones are despised. Nevertheless, slight indication of improvement is now seen under the name of better patient service. Yet,

staff zone such as changing room, staff canteen and medical doctors' office are' in darkness'. Based on the idea to medical staff as spiritual position and holy orders, self-sacrificing spirit is requested, However, without adequate support and rest, it is cruel to ask for sufficient quality of work.

Architecture is culture, thus either public or private buildings should be constructed to last for several generations. Unfortunately, among health organizations, this idea is lacking. Build economical, demolish soon when it becomes inconvenient.

As is generally known from the ancient time, natural environment contributes to recovery from illness. Hospital architecture with artificial environ - ment lost this effect. In many developed countries, ambulant surgery is in attention to reduce length of stay in hospital. Despite this trend caused by financial reasons, it helps patients to stay in their daily environment. Naturally, patients do not wish to stay in hospitals for long time. 8y creating ordinary daily environment and conformable space within hospital, baneful influence of total institution can be reduced. On the basis of the above disc - ussion, it is important to create' healing envir - onment' Concerning hospital architecture as hard' healing environment', soft' healing environment' such as staffs smiling, tidy rooms and tasty food is essential. Without software, well-designed building and high-tech equipment cannot create real healing environment.

G. Future Studies in Healthcare Environ- ment

These aspects above are based on various studies carried out in the University of Tokyo and other Universities/Research Organization, including Men-Environment Research Association (MEHA), one of the International Endorsing Organization of this Congress, and also explained through showing recent prominent projects of healthcare facility design, mainly from those awarded by Japan Institute of Health care Architecture (JIHA). However, further studies for the future is necessary.

Human population on the planet earth reached one billion in 1804. In 1927(123years later) it was 2 billion. Each successive billion came in increasingly shorter intervals. A population of 3, 4, 5 and 6 billion was reached respectively in 1960(33 years), in 1974(14years), in 1987(13 years) and in 1999 (12years). Recent projections estimate the world population will reach 8.9 billion in 2050 despite falling birth rates in many countries. Most of the gain will occur in developing countries which are already overpopulated. The rough estimated 10 billion plus inhabitants in the latter half of the If st century will certainly, according to current underst - anding of eventual conditions, will likely need to the very concerned with outstripping natural resources on the earth.

According to the "Agenda 21" statement from the UNCEO in Rio do Janeiro in 1992,60% oft he Earth's population will be living in cities by the year 2050. The critical issues that will face these populations and their governing bodies are numer - ous, and include : air quality and airpollution, water quality and water pollution, nutrition and food supplies, congestion of communication and transp - ortation systems, noise, stress, and access to open spaces and recreation areas, responsive education, social, and criminal justice systems, sufficient empl - oyment and housing opportunities, brutal commercial development Equitable opportunities for economic development, peace and prosperity and above all access to quality and affordable health care are crucial issues. How do we achieve this goal?

Against the background and in recognition of the importance of the above issues of future healthcare 8nd healthcare architecture, in 1999, 1 began to prepare, under agreement and with the support of Government of Japan, "Global Studies on Health for the year 2050" incorporation with George 4. Mann, Professor, College of Architecture, Texas A&M University, USA, and Rosemary Glanville, Director, Medical Architecture Research Unit, South Bank University, UK, Global University Programs in Healthcare Architecture (GUPHA) was established in order to pursue the study objectives. Special GUPHA Forum was held in Vancouver on the occasion of "Beyond 2000'. An International Confer -

ence on Architecture for Health presented by American Institute of Architects' Academy of Architecture for Health", October 25-28, 2000. At present, GUPHA has more than dozen members all over the world.

Finally, I want conclude by offering my hear felt belief that it is incumbent upon us to leave to our precious children a world that is in some significant measure a better one than that in which we find ourselves today.

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